

**ORIGINAL RESEARCH**

# Analysis of Anesthetic Efficacy of 4% Articaine and 2% Lidocaine for Buccal Infiltration in Adult Patients with Irreversible Pulpitis of Maxillary First Molar: A comparative study

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**ABSTRACT**

**Background:** The present study was conducted for analysing anesthetic Efficacy of 4% Articaine and 2% Lidocaine for Buccal Infiltration in Adult Patients with Irreversible Pulpitis of Maxillary First Molar. **Materials & methods:** A total of 100 patients were enrolled in the present study. Only those patients were enrolled which had moderate-to-severe pain in maxillary first molar tooth along with a positive response to cold test. All the patients were randomized into two study groups as follow: Group A: 4% Articaine group, and Group B: 2% Lidocaine group. Visual Analog scale (VAS) was used for assessment of pain. It measured pain on a scale of 0 to 10 with 0 indicating no pain and 10 indicating most severe pain. Measurement of tooth length was done on the basis of preoperative radiographs. Aspiration was performed and aesthetic solution was deposited according to the respective groups. After a time interval of six min post injection of anesthetic agent, the patients were asked to rate their pain on VAS. The access opening (AO) was initiated only when the patient experienced either no pain. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. **Results:** Mean VAS among patients of group A and group B was 1.9 and 2.8 respectively. Success rate among patients of group A and group B was 94 percent and 84 percent respectively. Significantly better results were obtained among patients of group A in comparison to patients of group B. **Conclusion:** The anesthetic efficacy of 2% lidocaine with 1:80,000 epinephrine was less as compared to 4% articaine with 1:100,000 epinephrine.

**Key words:** Articaine, Lidocaine

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**INTRODUCTION**

According to the conventional view, irreversible pulpitis is identified when pulp inflammation reaches a specific level, and root canal treatment (RCT) is typically used to entirely remove pulp tissue. RCT, however, may result in vascularity deficits that ultimately increase the risk of fracture. The long-term preservation rate of problematic teeth following RCT was much lower than that of important teeth, despite the fact that RCT was the gold standard of care, and this phenomenon was especially notable in molars.<sup>1, 2</sup> This may be due to the higher resistance to occlusal forces within the physiological range that exists in

essential teeth with more soft and hard structures. Vital pulp therapy (VPT), which removes a certain amount of pulp based on pulpal condition, is seen to be a potential personalised treatment for irreversible pulpitis since it allows for the retention of more soft and hard tissues than RCT.<sup>3, 4</sup> Hence; the present study was conducted for analysing anesthetic Efficacy of 4% Articaine and 2% Lidocaine for Buccal Infiltration in Adult Patients with Irreversible Pulpitis of Maxillary First Molar.

## MATERIALS & METHODS

The present study was conducted for analysing anesthetic Efficacy of 4% Articaine and 2% Lidocaine for Buccal Infiltration in Adult Patients with Irreversible Pulpitis of Maxillary First Molar. A total of 100 patients were enrolled in the present study. Only those patients were enrolled which had moderate-to-severe pain in maxillary first molar tooth along with a positive response to cold test. Patients who consumed any medication in the last one day that would alter pain perception were excluded. All the patients were of symptomatic irreversible pulpitis in maxillary first molars. All the patients were randomized into two study groups as follow:

Group A: 4% Articaine group

Group B: 2% Lidocaine group

Visual Analog scale (VAS) was used for assessment of pain. It measured pain on a scale of 0 to 10 with 0 indicating no pain and 10 indicating most severe pain. Measurement of tooth length was done on the basis of preoperative radiographs. Aspiration was performed and aesthetic solution was deposited according to the respective groups. After a time interval of six min post injection of anesthetic agent, the patients were asked to rate their pain on VAS. The access opening (AO) was initiated only when the patient experienced either no pain. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

## RESULTS

Mean VAS among patients of group A and group B was 1.9 and 2.8 respectively. Success rate among patients of group A and group B was 94 percent and 84 percent respectively. Significantly better results were obtained among patients of group A in comparison to patients of group B.

**Table 1: Comparison of pain**

Pain as per VAS	Group A	Group B
Mean	1.9	2.8
SD	1.2	1.8
p-value	0.00 (Significant)	

**Table 2: Comparison of failed cases**

Cases	Group A	Group B
Success	47	42
Failed	3	8
p-value	0.00 (Significant)	

## DISCUSSION

Pain control during and after root canal treatment is an important subject that has attracted considerable attention. One of the most important steps during root canal treatment of teeth with irreversible pulpitis is to provide profound anesthesia in order to prevent pain perception during the procedure.<sup>5</sup> Numerous investigations have focused on assessing different devices, different anesthetic agents, and supplemental anesthetic techniques to increase the ability of

clinicians to overcome pain during treatment and to provide higher success rates of anesthesia.<sup>6, 7</sup> Most of these investigations have been performed on mandibular teeth due to the perception that achieving anesthesia in mandibular teeth is much more difficult than their maxillary counterparts.<sup>8-10</sup>

Mean VAS among patients of group A and group B was 1.9 and 2.8 respectively. Success rate among patients of group A and group B was 94 percent and 84 percent respectively. Significantly better results were obtained among patients of group A in comparison to patients of group B. Syed, G. A et al compared the anesthetic efficacy of 0.8 ml of 4% articaine and 1.6 ml of 2% lidocaine administered through buccal infiltration (submucosal) only in adult male and female patients with irreversible pulpitis of maxillary 1st molar. Two hundred patients with irreversible pulpitis of the maxillary first molar were divided into four study groups and received only buccal infiltration of either 0.8 ml of 4% articaine or 1.6 ml of 2% lidocaine. No significant difference was found in the number of failed cases on using 4% articaine and 2% lidocaine ( $P > 0.05$ ). Moreover, no significant difference was found in the number of failed cases between the genders in Group I (4% articaine with 1:100,000 epinephrine) and also in Group II (2% lidocaine with 1:80,000 epinephrine). On comparing the mean pain scores of failed cases, it has been found that females experience more pain than males in Group I (not significant) and Group II (significant).<sup>11</sup>

In another previous study conducted by Miglani, S et al, authors determined the performance of 4% Articaine vs. 2% Lidocaine for mandibular and maxillary block and infiltration anaesthesia in patients with irreversible pulpitis (IP). PubMed/MEDLINE, Cochrane Central Register of Controlled Trials, Web of Science, Google Scholar, and Open Gray were used to conduct a thorough literature search. A total of twenty-six papers were included in the qualitative synthesis, with twenty-two of them being included in the meta-analysis. There were fifteen studies with a low potential for bias, three with a moderate potential for bias, and seven with a high potential for bias. Excluding subgroups with a single study in sensitivity analysis for mandibular teeth revealed a substantial improvement in the success rate of the articaine group in treating IP when compared to the lidocaine group.<sup>12</sup> Srinivasan N et al, in another previous study, compared the anesthetic efficacy of 4% articaine and 2% lidocaine (both with 1:100,000 epinephrine) for buccal infiltration in patients experiencing irreversible pulpitis in maxillary posterior teeth. The success rate for maxillary buccal infiltration to produce pulpal anesthesia using articaine was 100% in first premolar and first molar, and for the lidocaine solution, success rate was 80% in first premolar and 30% in first molar. There was high significant difference between the articaine and lidocaine solutions. The efficacy of 4%

articaine was superior to 2% lidocaine for maxillary buccal infiltration in posterior teeth.<sup>13</sup>

patients with irreversible pulpitis. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2009 Jan;107(1):133-6.

## CONCLUSION

The anesthetic efficacy of 2% lidocaine with 1:80,000 epinephrine was less as compared to 4% articaine with 1:100,000 epinephrine.

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